



Nebraska Rainfall Assessment and Information Network

Guide to Measuring Snow

Equipment

1. The 4" diameter rain gauges that we use for NeRAIN can be used for measuring the water content of snow. However, **you must remove the inner measuring cylinder and funnel** for measurements of snow water content and other freezing/frozen precip. The inner tube can easily crack and break if moisture collects and then freezes. But keep the funnel and measurement tube handy indoors -- you'll need it.
2. Have a ruler or yardstick ready. (ideally one that measures in inches and tenths).
3. You should have a snow board (a flat board, **painted white**, ideally about 16" x 16"). They come in very handy for measuring snowfall. For those of you who got the boards I handed out that can also be used for mounting your hail pads, these boards are just right for measuring snow. If not, that's OK, but you will need to identify a good representative location that is as flat and level as possible where snow accumulates uniformly and does not melt prematurely. Wooden decks are OK, but they should be at least 20-30 feet away from your house since your house will affect snow accumulation patterns.
4. You may need to have warm water handy.

Measuring Precipitation - the water content of snow

The snow (rain, freezing rain, etc. too) will collect in the 4" diameter outer cylinder (overflow cylinder). If snow collects on the rim of the gauge you have to decide what belongs in or out of the gauge. I just take a book or flat object and push gently straight down on the top of the gauge. Whatever falls in is in, and whatever falls out is out. It may not be perfect, but at least it's objective. With wet snows, a lot of snow can collect on the rim, so it makes a difference.

Bring the gauge inside at your time of observation. If it has stopped snowing, you can bring it in earlier and just let the snow melt. But you may need to hasten the process. In order to measure the water content of snow with this type of gauge, **you will need to melt the contents and pour them back into the calibrated inner cylinder.**

What I do is take my inner calibrated cylinder and pour warm water into it and jot down the amount. Then I add that warm water to the outer cylinder so that all the snow melts. Then I pour the water back into the inner tube and record the total amount. For example, lets say I added 0.51" of warm water to the snow. Then when I measured the total sample, it read 0.82" How much precipitation did I get? The answer should be 0.31"

0.82" - Total of melted snow with the added warm water

-0.51" - Total warm water added to melt snow

0.31" - Daily Precipitation

(the amount you should report)

I hope that makes sense. Make sure you avoid spilling. It can happen.

Some people have come up with creative ways to melt their snow in their microwave or by setting their gauge in a basin of warm water. That way they don't have to add and subtract additional water. Microwaving rain gauge samples is not recommended, but a careful person can do it successfully, or so I've been told. I've never tried it.

When you're done, put the outer cylinder back outside, clean and dry, so it's ready to collect the next snow (During heavy snow (6" or greater) the cylinder will fill to the top and overflow with snow. You will have to measure more often than once daily under heavy snow conditions.

Measuring Snowfall - New Snow Amount

Snowfall is the maximum accumulation of fresh snow during the past day prior to melting or settling. We measure snowfall to the nearest 0.1 (one-tenth) inch. Maybe you have a ruler in tenths like me, but many don't. Since snow melts and settles, you may have to measure during or soon after snow ends in order to capture how much accumulated. By 7 AM their may be less.

For example if the snow begins to fall in mid morning, accumulates to 4.2" by 3 PM and then stops and begins melting and settling such that by 7 AM the next morning you only have 2.6" of snow on your snowboard, then the correct number to report for your 24-hour snowfall (new snow amount) is 4.2" -- the accumulation prior to melting and settling. If the ground was bare prior to this snow your snowdepth (total depth of snow on the ground) would be rounded to the nearest half inch and would be reported as 2.5 inches.

The trick in measuring snow consistently is simply finding a good place to measure and a firm surface (such as a snow board) for your ruler to set on. Some people use low picnic tables, some use their car. I don't recommend sidewalks since they tend

to accelerate melting. Grass is where snow accumulates first, and it is OK to measure on grassy surfaces, but please know that the snow tends to sit up on top of the blades of grass, sometimes by one to three inches. Your ruler, on the other hand, will go right down through the snow and grass to the ground and give you an exaggerated reading. Just be careful to measure to the bottom of the snow not to the ground.

Measuring new snow accumulation is easy when the snow falls without wind and isn't melting on the ground. But when the wind blows, measuring snow becomes a real challenge. We deal with drifted snow by simply taking many measurements from a variety of locations and averaging them to get a representative measure. You will get the hang of this -- with experience.

If you use a snowboard, [take a core sample](#) and then be sure to clear the board after your measurement and set it in a nearby location level on the surface of the new snow. If you leave it down in a depression, it will tend to collect more snow from drifting if the snow continues.

Snow depth - Total depth of snow on the ground.

Snow depth is simply the total depth of snow on ground at your scheduled observation time (hopefully 7 AM or close). Snowdepth is measured to the nearest half inch. It includes both new and old snow, and should be reported even on days when no new snow has fallen. If necessary, take an average of several measurements. For example, if half the ground has 2" of old snow and the other half of the ground is already bare, the average snowdepth would be 1".

Snow Cores - Core Precipitation

Under some circumstances (primarily strong winds), your 4" diameter gauge will not catch all of the snow that has fallen. You can watch windblown snow crystals curve around a rain gauge like water going around a rock in a river. If you believe your gauge has not adequately caught the precipitation that has fallen (or, if you're just curious), then take a core sample of the fresh snow that has fallen. After first [measuring the water content](#) in the gauge, then take the 4" outer cylinder and "cut a biscuit" in the fresh snow by pushing it straight down. It is best to do this on your snowboard (after you've measured the snow depth, but before you have cleared the snow and put it back on the surface). Use a thin sturdy cookie sheet or something like that to slide under the cylinder so that you can lift it up without spilling the contents. Be sure to measure in a representative location -- not in a drift or in a wind-blown or melted area. Then proceed to melt and [measure the water content](#) like you would with any other measurement.

